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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,074

07/14/2006

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7383-88748

9438

22242 7590 11/26/2008
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EXAMINER

REDDY, SATHAVARAM I

ART UNIT

PAPER NUMBER

4152

MAIL DATE

DELIVERY MODE

11/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,074	Applicant(s) ZHANG ET AL.	
	Examiner SATHAVARAM I. REDDY	Art Unit 4152	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/8/2007</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 22, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Fisher et al (US 6,323,268).

Regarding claim 1, Fisher et al (US 6,323,268) discloses a method of rendering a microstructured surface of a substrate hydrophobic comprising applying a coating composition to the microstructured surface (col. 8, lines 19-26) having a nanoscale roughness (col. 7, lines 49-52) and curing the composition to form a hydrophobic coating (col. 8, lines 19-26) with a nanoscale roughness (col. 7, lines 49-52) giving the resultant surface both nanoscale roughness and microscale roughness (col. 7, lines 49-52).

Regarding claim 22, Fisher et al (US 6,323,268) discloses a hydrophobic substrate that has at least one hydrophobic surface (col. 7, lines 33-35).

Regarding claim 24, Fisher et al (US 6,323,268) discloses a hydrophobic substrate that has at least one hydrophobic surface (col. 7, lines 64-67 and col. 8, lines 1-3).

3. Claims 1-5, 8-9 and 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Schmidt et al (US 6,287,639).

Regarding claim 1, Schmidt et al (US 6,287,639) discloses a method of rendering a microstructured surface of a substrate hydrophobic comprising applying a coating composition to the microstructured surface having a nanoscale roughness (col. 1, lines 3-24; col. 4, lines 57-67; col. 5, lines 1-14) and curing the composition to form a hydrophobic coating with a nanoscale roughness (col. 1, lines 3-24; col. 4, lines 57-67; col. 5, lines 1-14) giving the resultant surface both nanoscale roughness and microscale roughness (col. 1, lines 3-24; col. 4, lines 57-67; col. 5, lines 1-14).

Regarding claim 2, Schmidt et al (US 6,287,639) discloses the coating composition comprising one of more tri-functional alkylsilanes ($\text{CH}_3\text{-Si(OC}_2\text{H}_5)_3$: methyltriethoxysilane", $\text{n-C}_8\text{H}_{17}\text{-CH}_2\text{CH}_2\text{-Si(OC}_2\text{H}_5)_3$: dodecyltriethoxysilane"; col. 1, lines 3-24; col. 3, lines 19-40) with the hydrophobic coating having a nanoscale roughness and being formed by molecules of the tri-functional alkylsilanes reacted together in a sol-gel reaction (col. 1, lines 3-24; col. 4, lines 57-67; col. 5, lines 1-14).

Regarding claim 3, Schmidt et al (US 6,287,639) discloses the coating composition comprising two of more tri-functional alkylsilanes having different alkyl lengths ($\text{CH}_3\text{-Si(OC}_2\text{H}_5)_3$: methyltriethoxysilane", $\text{n-C}_8\text{H}_{17}\text{-CH}_2\text{CH}_2\text{-Si(OC}_2\text{H}_5)_3$: dodecyltriethoxysilane"; col. 1, lines 3-24; col. 3, lines 19-40).

Regarding claim 4, Schmidt et al (US 6,287,639) discloses the coating composition comprising one tri-functional alkylsilanes having an alkyl chain length less than 3 carbon units and one tri-functional alkylsilane having an alkyl chain length of 6 to 30 carbon units ($\text{CH}_3\text{-Si(OC}_2\text{H}_5)_3$: methyltriethoxysilane", $\text{n-C}_8\text{H}_{17}\text{-CH}_2\text{CH}_2\text{-Si(OC}_2\text{H}_5)_3$: dodecyltriethoxysilane"; col. 1, lines 3-24; col. 3, lines 19-40).

Regarding claim 5, Schmidt et al (US 6,287,639) discloses the functional groups of the tri-functional alkylsilanes being alkoxy ($\text{CH}_3\text{-Si(OC}_2\text{H}_5)_3$: methyltriethoxysilane", $\text{n-C}_8\text{H}_{17}\text{-CH}_2\text{CH}_2\text{-Si(OC}_2\text{H}_5)_3$: dodecyltriethoxysilane"; col. 1, lines 3-24; col. 3, lines 19-40).

Regarding claim 8, Schmidt et al (US 6,287,639) discloses the coating composition comprising an organic solvent (col. 4, lines 33-38).

Regarding claim 9, Schmidt et al (US 6,287,639) discloses the organic solvent being tetrahydrofuran (col. 4, lines 33-38).

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Regarding claim 11, Schmidt et al (US 6,287,639) discloses curing at a curing temperature at room temperature (col. 5, lines 12-14).. Room temperature is usually between 20°C to 28°C

Regarding claim 12, Schmidt et al (US 6,287,639) discloses curing at a curing temperature above 50°C (col. 5, lines 12-14).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (US 6,287,639) in view of Fisher et al (US 6,323,268).

Schmidt et al (US 6,287,639) discloses the invention as claimed in claim 2.

Schmidt et al (US 6,287,639) does not appear to explicitly disclose a polysiloxane polymer.

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However, Fisher et al (US 6,323,268) discloses a polysiloxane polymer (col. 2, line 65-67; col. 3, lines 1-13; col. 9, lines 55-67)

Schmidt et al (US 6,287,639) and Fisher et al (US 6,323,268) are analogous art because they are from the same field of hydrophobic substrates.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Schmidt et al (US 6,287,639) and Fisher et al (US 6,323,268) before him or her, to modify the hydrophobic substrate of Schmidt et al (US 6,287,639) to include the polysiloxane polymer of Fisher et al (US 6,323,268) because you can add a polysiloxane polymer to a coating to bind the alkylsilanes together.

The motivation for doing so would have been that adding a polysiloxane polymer to a coating is necessary in order to provide good 21 day water exclusion percentage and good percent reduction (col. 11, lines 32-39 of Fisher et al (US 6,323,268)).

Therefore, it would have been obvious to combine Schmidt et al (US 6,287,639) with Fisher et al (US 6,323,268) to obtain the invention as specified in claims 6-7.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (US 6,287,639).

Schmidt et al (US 6,287,639) discloses the invention as claimed in claim 2.

Schmidt et al (US 6,287,639) does not appear to disclose a curing temperature between 60°C to 80°C. However, Schmidt et al (US 6,287,639) discloses a curing temperature above 50°C (col. 5, lines 12-14).

Schmidt et al (US 6,287,639) and the claims differ in that the curing temperature above 50 °C does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional proportions taught by Schmidt et al (US 6,287,639) overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

7. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al (US 6,323,268) in view of Gross et al (US 6,649,266).

Fisher et al (US 6,323,268) discloses the invention as claimed in claim 1.

Fisher et al (US 6,323,268) does not appear to explicitly disclose a contact angle greater than 130°.

However, Gross et al (US 6,649,266) discloses a contact angle greater than 170° (col. 3, lines 1-12).

Gross et al (US 6,649,266) and the claims differ in that the contact angle of 170° does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional proportions taught by Gross et al (US 6,649,266) overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Fisher et al (US 6,323,268) and Gross et al (US 6,649,266) are analogous art because they are from the same field of hydrophobic substrates.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Fisher et al (US 6,323,268) and Gross et al (US 6,649,266) before him or her, to modify the hydrophobic structure of Fisher et al (US 6,323,268) to include the contact angle of greater than 170° of Gross et al (US 6,649,266) because you can have a microstructure substrate and you can form so that when you drop water on the substrate it will have a contact angle greater than 170° .

The motivation for doing so would have been that having a forming a microstructured substrate in order to have a contact angle greater than 170° leads to a lower tendency of a liquid to wet the solid substrate (col. 2, lines 63-67).

Regarding claim 14, Gross et al (US 6,649,266) discloses a contact angle greater than 170° (col. 3, lines 1-12).

Gross et al (US 6,649,266) and the claims differ in that the contact angle of 170° does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional

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proportions taught by Gross et al (US 6,649,266) overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Regarding claim 15, Gross et al (US 6,649,266) discloses a contact angle greater than 170° (col. 3, lines 1-12).

Gross et al (US 6,649,266) and the claims differ in that the contact angle of 170° does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional proportions taught by Gross et al (US 6,649,266) overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

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“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Therefore, it would have been obvious to combine Gross et al (US 6,649,266) with Fisher et al (US 6,323,268) to obtain the invention as specified in claims 13-15.

8. Claims 10, 16-21, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al (US 6,323,268) in view of Baumann et al (US 6,800,354).

Regarding claim 16, Fisher et al (US 6,323,268) discloses applying a coating composition to the microstructured surface (col. 8, lines 19-26) having a nanoscale roughness (col. 7, lines 49-52) and curing the composition to form a hydrophobic coating (col. 8, lines 19-26) with a nanoscale roughness (col. 7, lines 49-52) giving the resultant surface both nanoscale roughness and microscale roughness (col. 7, lines 49-52).

Fisher et al (US 6,323,268) does not appear to explicitly disclose treating a substrate to form a microstructures surface.

However, Baumann et al (US 6,800,354) discloses treating a substrate to form a microstructures surface (col. 3, lines 39-46 and col. 7, lines 54-61). A microstructured surface is formed by applying a composition comprising inorganic oxide particles such as silica onto a substrate.

Regarding claim 17, Baumann et al (US 6,800,354) discloses the surface of the substrate treated to form a microstructured surface (col. 3, lines 39-46; col. 7, lines 54-61).

Regarding claim 18, Baumann et al (US 6,800,354) discloses the surface is treated by applying a coating composition to the surface to form a coating where the coating has a microstructured surface (col. 3, lines 39-46; col. 7, lines 54-61).

Regarding claim 19, Baumann et al (US 6,800,354) discloses the microstructured surface being formed by applying a composition comprising microparticles to the surface (col. 3, lines 39-46; col. 7, lines 54-61).

Regarding claim 20, Baumann et al (US 6,800,354) discloses the microparticles being inorganic oxide microparticles (col. 3, lines 39-46).

Regarding claim 23, Fisher et al (US 6,323,268) discloses a hydrophobic or superhydrophobic film produced the method of claim 16 (col. 7, lines 33-35).

Regarding claim 25, Fisher et al (US 6,323,268) discloses a hydrophobic substrate that has at least one hydrophobic surface (col. 7, lines 64-67 and col. 8, lines 1-3).

Fisher et al (US 6,323,268) and Baumann et al (US 6,800,354) are analogous art because they are from the same field of hydrophobic substrates.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Fisher et al (US 6,323,268) and Baumann et al (US 6,800,354) before him or her, to modify the hydrophobic substrate of Fisher et al (US 6,323,268) to include the substrate treatment of Baumann et al (US 6,800,354) because you can treat a substrate with a composition of inorganic oxide microparticles in order to form a microstructured surface on a substrate.

The motivation for doing so would have been that treating a substrate by applying inorganic oxide microparticles to a surface to form a microstructured surface is necessary in order to improve the abrasion resistance of a surface (col. 2, lines 50-55 of Baumann et al (US 6,800,354)).

Regarding claims 10 and 21, Fisher et al (US 6,323,268) discloses the invention as claimed in claim 1 and along with Baumann et al (US 6,800,354) the invention as claimed in claim 16. Fisher et al (US 6,323,268) does not appear to disclose an applied hydrophobic coating that has a thickness of 0.1 to 1 micron thick. However, Fisher et al (US 6,323,268) discloses an applied hydrophobic coating between 5 nm to 1000 nm thick (col. 8, lines 29-39).

Fisher et al (US 6,323,268) and the claims differ in that the thickness of 5 nm to 1000 nm does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional proportions taught by Fisher et al (US 6,323,268) overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

The motivation for doing so would have been that having such a thickness of a hydrophobic coating helps in forming a microstructured substrate by providing a higher maximum height (col. 8, lines 29-39 of Baumann et al (US 6,800,354)).

Therefore, it would have been obvious to combine Baumann et al (US 6,800,354) with Fisher et al (US 6,323,268) to obtain the invention as specified in claims 10, 16-21, 23 and 25.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kirchmeyer et al (US 5,547,711), Weidner et al (US 5,681,892), Buckingham et al (US 5,695,551), Hager et al (US 5,798,429), Heller et al (US 5,849,200), Monkiewicz et al (US 2003/0186066), Kanamori et al (US 6,756,124) and Windridge et al (US 7,311,770).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SATHAVARAM I. REDDY whose telephone number is (571) 270-7061. The examiner can normally be reached on 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Del Sole can be reached on (571) 272-1130. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SIR

/Joseph S. Del Sole/
Supervisory Patent Examiner, Art Unit 4152